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13. SUPPLEMENTARY NOTES

14. ABSTRACT

Current ground-based introductory night vision goggle (NVG) training consists of classroom lectures, hands-on adjustment training, terrain board demonstrations, and, for a few platforms, simulator training. The content of the lectures was developed jointly between the USAF and USN and is standardized for all platform types. NVG video sequences of actual events are integrated with the lectures to support verbal descriptions of operationally relevant concerns, such as illusion and misperceptions. Terrain boards are used to demonstrate visual phenomena specific to the NVG image resulting from the intensification process. NVG-capable simulators provide for good "system integration" training (e.g., looking beneath the NVG at cockpit instruments, scanning the outside scene, etc.), but due to inadequacies with the simulated imagery, there are serious limitations to "visual" training. Consequently, terrain board demonstrations continue to be the best method of demonstrating many of the NVG image characteristics. There is currently no "table-top" computer training available for reinforcing some of the more important NVG lessons learned from operational experience and mishaps.

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Improving Aircrews' Crosscheck of Flight Instruments when Using NVGs

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Current ground-based introductory night vision goggle (NVG) training consists of classroom lectures, hands-on adjustment training, terrain board demonstrations, and, for a few platforms, simulator training. The content of the lectures was developed jointly between the USAF and USN and is standardized for all platform types. NVG video sequences of actual events are integrated with the lectures to support verbal descriptions of operationally relevant concerns, such as illusion and misperceptions. Terrain boards are used to demonstrate visual phenomena specific to the NVG image resulting from the intensification process. NVG-capable simulators provide for good "system integration" training (e.g., looking beneath the NVG at cockpit instruments, scanning the outside scene, etc.), but due to inadequacies with the simulated imagery, there are serious limitations to "visual" training. Consequently, terrain board demonstrations continue to be the best method of demonstrating many of the NVG image characteristics. There is currently no "table-top" computer training available for reinforcing some of the more important NVG lessons learned from operational experience and mishaps.

The majority of Class A NVG-related mishaps in the USAF/USN/USMC fixed wing community have been controlled flight into terrain (CFIT) events. CFIT is also causal in many of the NVG-related Class A mishaps in all services' rotor wing communities. CFIT mishaps result from many factors but the root cause is a breakdown in the crosscheck of flight instruments. In most cases, had aircrew been closely monitoring the flight instruments, inadvertent flight into the ground or water would have been avoided. With the exception of a few simulators in a few communities, there is no ground training that adequately prepares aircrew to conduct a proper instrument crosscheck during various mission profiles and at varying levels of cockpit workloads. Consequently, this is left to flight training where, in most cases, it is difficult for instructors to monitor students' actions, there are few NVG training sorties in the syllabus, and the training sorties usually do not incorporate a wide range of demanding operational profiles. Since CFIT mishaps are the most common type of Class A NVG-related mishaps, developing a way to improve training and thus instill improved instrument crosscheck habit patterns should lead to a savings in expensive assets, most importantly of which are aircrew.

Appropriate training should place the student in a cockpit environment with various sensory challenges (e.g., outside visual scene, head down tasks, communication tasks, differing mission profiles, etc.) requiring specific psycho-motor responses (e.g., time-sharing between outside scan and instrument scan, prioritizing scan patterns, etc.). The training should help students better understand the need for incorporating a sound instrument scan, should provide information useful during preflight planning, and should begin the establishment of good habit patterns when using NVGs. Virtual reality has not been seriously investigated as a method of improving or augmenting existing NVG ground training, much less a specific aspect of that training. Research in this area has the potential for helping solve this problem that continues to be a threat during all NVG sorties.

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